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ABSTRACT

The report assesses the ability of the 44 Appalachia Educational Laboratory's Employer-Based Career Education (AEL/EBCE) students to maintain their expected academic competence as measured by a nationally normed achievement test, the Iowa Tests of Educational Development, administered at different times during the 1972-73 program year. The students comprised two groups: those entering in September 1972 and those entering in January 1973. The former were tested in September 1972 and in February and May 1973; the latter were tested in February and May 1973. Test results indicated that: students registered much greater competence in mathematics than in reading, language arts, social studies, science, and the use of sources; during the year the students' growth rate exceeded the expected growth rate, even in mathematics, in all areas except use of sources; there were no significant test score differences between the group which participated for the entire academic year and the group which participated for only half of the year; and whether students took courses for credit or non-credit had little apparent effect on performance in science, social studies, and mathematics. Three appendixes provide variance tables for growth score comparisons, post-test raw score comparisons, and subtest scores according to sex and credit/non-credit differences. (Author/JR)

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Employer-Based Career Education

Analysis of Scores on the Iowa Tests of Educational Development

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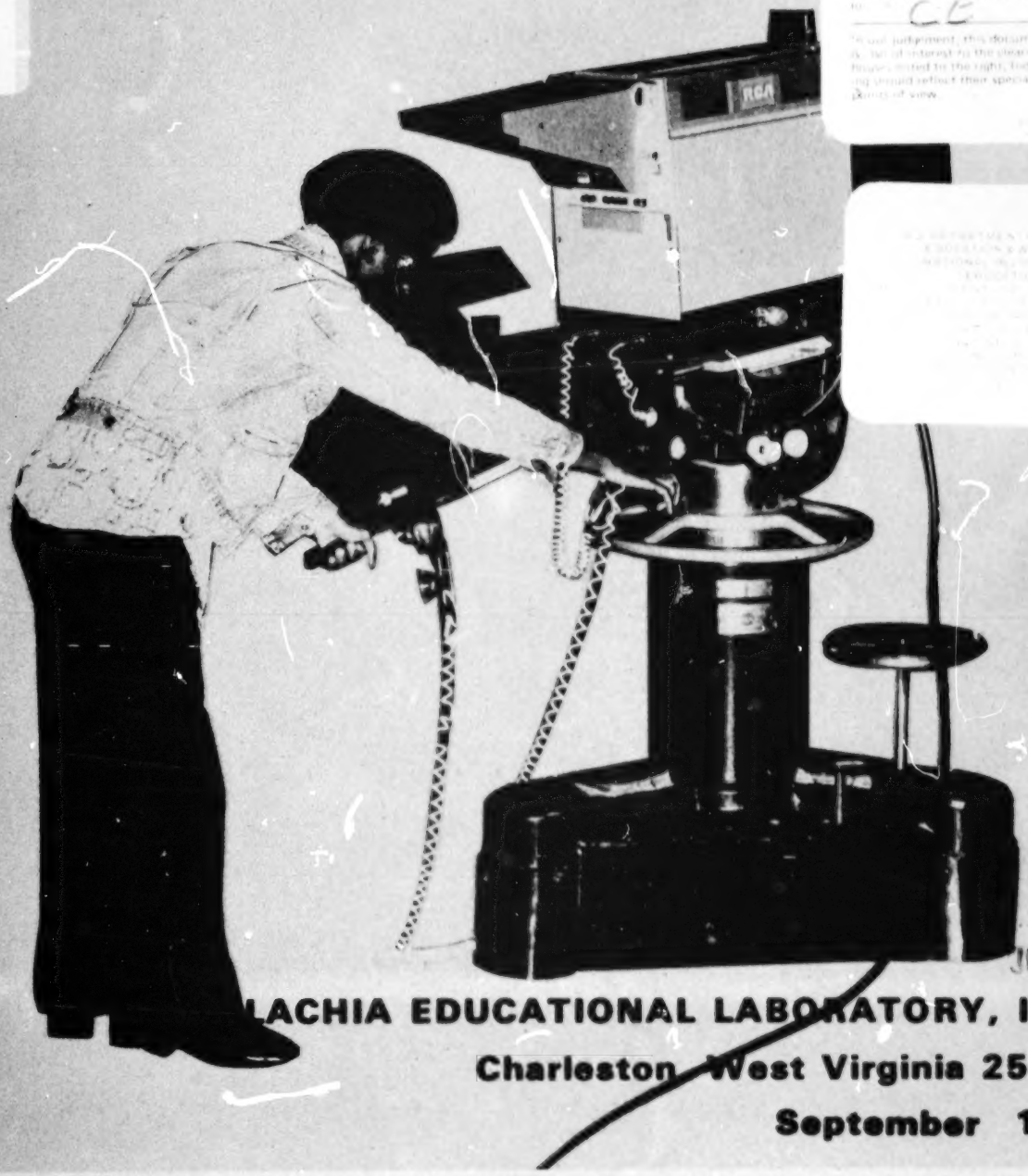

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APPALACHIA EDUCATIONAL LABORATORY, INC.
Charleston, West Virginia 25325

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Cover picture: Sam Burge, an EBCE student learns the fundamentals of operating a television camera at WMUL-TV in Nitro, West Virginia

Employer-Based Career Education

Analysis of Scores on the Iowa Tests of Educational Development

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TECHNICAL REPORT NO. 38

RESEARCH AND EVALUATION DIVISION
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Preface

One objective of the Employer-Based Career Education (EBCE) program during the 1972-73 school year was for participating students to maintain the same level of academic performance as similar students in a conventional high school setting. The focus of this report is on the ability of AEL/EBCE students to maintain their expected academic competence according to a nationally normed achievement test administered at different times during the program year.

This report is one of a series resulting from the AEL/EBCE program during the first test year beginning in September of 1972 and ending in June of 1973. The report was written by Dr. James T. Ranson of the West Virginia College of Graduate Studies under contract to the Laboratory. The evaluation was conducted and supervised by Dr. James H. Sanders, AEL/EBCE Evaluation Specialist, and under the general direction of Dr. Charles L. Bertram, Director of Research and Evaluation for the Laboratory.

The report was reviewed by members of the AEL/EBCE design and operations staff in order to obtain technical advice and insure that the descriptions and interpretations were commensurate with the experience of those who had worked closely with the students during the year. Critical reviews of the early drafts of this report were provided by Ms. Charlotte Hollenbert, Associate Educational Development Specialist, Mr. Mark C. Fawcett, Learning Coordinator, and Dr. John Hildebrand, Associate Educational Development Specialist.

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Introduction

As a part of the overall evaluation of the Employer-Based Career Education (EBCE) program at the Appalachia Educational Laboratory, Inc., certain academic traits of the participants in the project were of interest. Specifically, reading, language arts, math, social studies, science, and use of sources were of primary concern. These areas were of interest since performance in public school systems is primarily related to these areas, and one objective of the EBCE program was to maintain the same level of academic learning that the students would have exhibited in the public high schools.[1]

The participants in the EBCE program were high school seniors from the Kanawha County school system. The participants were volunteers; so this fact should be considered when inferences are made concerning the larger population from which they came.

The students in the EBCE program were high school seniors consisting mostly of boys. Of the total of 42 participants 11 were girls. The students were in two groups, the first consisting of 17 boys and 4 girls and the second made up of 14 boys and 7 girls.

The first group, or Group I, participated in the program during the entire academic year from September, 1972, to May, 1973, and the second group, or Group II, participated in the program from January, 1973, to May, 1973. These two groups therefore can hardly be thought of as an experimental and control group in the true sense of the word, but they can be used for some comparisons which will be reported further along in the report.

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[1]James H. Sanders. Outline of Product Evaluation Plan for Employer-Based Career Education. (Charleston, W.Va.: Appalachia Educational Laboratory, Inc., 1972).

The primary purpose of this study was to evaluate the academic growth of the participants in the EBCE program. This purpose seemed particularly relevant since the EBCE students were relinquishing part of their time to career related experiences which would have normally been given to the pursuit of academic subjects.

The Design

As reported earlier, two groups of 21 students participated in the program. Group I participated from Autumn, 1972, to Spring, 1973, and Group II participated from Winter, 1973, to Spring, 1973. The design is graphically illustrated in Figure 1.

Treatment	Autumn Testing September 1972 ▲	Winter Testing February 1973 ▲	Spring Testing May 1973 ▲
Group I	O_1 ⊢— EBCE ——	O_2 ⊢— EBCE ——	O_3
Group II	⊢— No exposure ——	O_4 ⊢— EBCE ——	O_5

Figure 1

Diagram of the Time Frame for Exposure of the Groups and Testing of the Students in the EBCE Program

Five different observation periods made up the points of the logical structure. Three observation points were devoted to Group I which participated during the entire academic year and two observation points were devoted to Group II which participated only during the second semester.

In accordance with the conditions just described and the purpose of the study, the following questions guided the analysis:

1. How did Group I compare with the national norms in the conventional academic areas during Autumn (O_1) and Spring (O_3) observation periods?
2. What was the academic growth of the participants during the year and how did this growth compare with the expected growth?
3. How did Group II which entered the program at midyear compare with the group which had been in the EBCE program since the first semester?
4. Did the fact that a course was taken for credit or noncredit have any effect on the ITED scores of the participants in the program?

Statistical Models

Each of the subtests of the Iowa Tests of Educational Development were analyzed independently. The statistical procedures used in the analyses were analysis of variance, t-test, and the studentized range (q).[2] In addition, analysis of covariance was employed. Appropriate analysis of variance and covariance tables are included in the appendix, and each statistical model is described as the results of the analyses are presented.

Results

Question One

The first question was, "How did Group I compare with the national norms in the conventional academic areas during the Autumn and Spring observation periods?" The Winter testing period was not included because no norms were available for the Winter period.

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[2] B. J. Winer, Statistical Principles in Experimental Design, McGraw-Hill Book Company, New York, 1962, p. 77-85.

As shown in Table 1, Group I was above the norm on mathematics and below the norm on reading, language arts, the composite (reading, language arts, and mathematics), and use of sources at both the Autumn and Spring testing periods. On social studies Group I was below the norm at the Autumn testing and about equal at the Spring testing. With science, the group was about even at both the Autumn and Spring testing periods.

Table 1

Norms, Means, Differences, and Z-Values for the ITED Growth Scores for Group I

	Norm	Observed Mean	Difference	Z	P
			Autumn		
Composite	540	496.62	-43.38	-2.01	.02
Reading	440	420.05	-19.95	-1.39	.08
Language Arts	438	399.90	-38.10	-2.57	.005
Mathematics	466	554.81	88.81	4.28	.0001
Social Studies	487	457.57	-29.43	-1.59	.06
Science	418	401.05	-16.95	-1.19	NS
Use of Sources	453	427.14	-25.86	-1.52	.06
			Spring		
Composite	548	508.71	-39.29	-1.82	.03
Reading	446	421.81	-24.19	-1.68	.05
Language Arts	445	417.81	-27.19	-1.83	.03
Mathematics	468	568.52	100.52	4.85	.00001
Social Studies	494	474.38	-19.62	-1.06	NS
Science	422	408.43	-13.57	-0.96	NS
Use of Sources	458	427.14	-30.86	-1.81	.03

The results were based on Z-ratios obtained from the growth score norm, observed growth score means, the norm standard deviations, and the number (2)) who participated in the study.

Question Two

The second question was, "What was the academic growth of the Group I participants during the year and how did this growth compare with the expected growth?" To arrive at an answer to this question, a standard error of the growth was defined from the subjects' growth scores. Subsequently, a t-ratio was computed using the mean expected growth and the mean observed growth. The expected growth means were obtained by subtracting the October growth score parametric mean from the May growth score parametric mean, and the observed growth score mean was obtained by subtracting the October observed mean from the May observed mean score.

Growth was indicated in all areas, except for use of sources where Group I showed zero growth and with the exception of reading and use of sources, the group exceeded the expected growth. In no instance did the difference between observed and expected growth reach a statistical significance level of .05. However, in language arts the t value was 1.42 which was a probability of less than .10. The data for this analysis are presented in Table 2.

Related to this question was, "How did Group I perform across the three testing periods?" To arrive at an answer to this question the raw scores were analyzed using an analysis of variance repeated measures model that tested for differences among the three testing periods. As indicated in Table 3, no statistically significant differences emerged. The data indicate that the performance in terms of raw scores remained the same throughout the academic year. The same analysis was conducted using the growth scores and the same results were obtained.

Table 2

Expected Growth on the ITED, Observed Growth, Differences, and t-Ratios for Group I Students

	Expected Growth Means	Observed Growth Means	Difference	t-Ratio	P
Composite	8	12.09	4.09	0.49	NS
Reading	6	1.76	-4.24	-0.55	NS
Language Arts	7	17.91	10.91	1.42	.10
Mathematics	[illegible]	13.71	11.71	0.75	NS
Social Studies	7	16.81	9.81	0.81	NS
Science	4	7.38	3.38	0.54	NS
Use of Sources	5	0.00	-5.00	-0.57	NS

Question Three

The third question was, "How did the new group which entered the program at midyear compare with the group which had been in the EBCE program since the first semester?" Since only a comparison of the two groups was of interest, the raw scores from the ITED subtest for each group were analyzed independently across the two testing periods.

As shown in Table 4, no statistically significant differences between the two groups emerged on any of the seven ITED subtests at either the Winter or Spring testing periods. The analysis indicates that the participants were from the same general population and that the skills and/or traits measured by the ITED are at the same level.

Table 3

Raw Scores, Growth Scores, F-Tests and Probability Levels for Group I ITED Subtests

	Autumn	Winter	Spring	F-Ratio	P
			Raw Scores		
Composite	43.14	45.81	45.48	0.161	NS
Reading	48.52	52.14	48.38	0.213	NS
Language Arts	10.90	43.61	47.29	0.767	NS
Mathematics	11.48	12.76	13.62	0.567	NS
Social Studies	22.43	24.81	26.67	1.276	NS
Science	25.33	28.10	25.71	0.381	NS
Use of Sources	22.90	23.52	22.90	0.036	NS
			Growth Scores		
Composite	496.62	509.33	508.71	0.169	NS
Reading	420.05	436.14	421.81	0.292	NS
Language Arts	399.90	411.62	417.81	0.410	NS
Mathematics	554.81	567.62	568.52	0.148	NS
Social Studies	457.57	478.24	474.38	0.367	NS
Science	401.05	423.76	408.43	0.477	NS
Use of Sources	427.14	435.86	427.14	0.095	NS

Table 4

Comparison of Group I and Group II ITED Raw Score Means for Winter and Spring Testing Periods

	Group I Means	Group II Means	F Ratio	P
		Winter		
Composite	45.81	48.22	0.219	NS
Reading	52.14	53.96	0.077	NS
Language Arts	43.62	47.74	0.626	NS
Mathematics	12.76	13.26	0.044	NS
Social Studies	24.81	24.56	0.007	NS
Science	28.09	28.08	0.000	NS
Use of Sources	23.52	26.91	1.481	NS
		Spring		
Composite	45.48	47.43	0.145	NS
Reading	48.38	52.22	0.389	NS
Language Arts	47.29	50.35	0.315	NS
Mathematics	13.62	13.52	0.002	NS
Social Studies	26.67	25.96	0.067	NS
Science	25.71	26.48	0.059	NS
Use of Sources	22.90	26.52	1.473	NS

Question Four

The fourth question which guided the evaluation was, "Did the fact that a course was taken for credit or noncredit have any effect on the participants' scores on the ITED?" To arrive at an answer to this question, growth scores from the science, social studies, and mathematics subtests were analyzed. These three measures were selected because the academic areas represented by the measures were emphasized in the EBCE program.

The analytical model used was factorial analysis of covariance. In each case, the pretest was the covariate and the posttest was the variate. For each of the analyses, pupil sex was controlled. Thus not only was the effect of receiving credit tested, but also the effects of sex and the interaction of sex and receiving credit.

Science. The mean growth scores for the pretest (the covariate), the posttest (the variate), and the adjusted mean growth scores are presented in Table 5. The adjusted analysis of variance yielded no statistically significant results. The results of this analysis are presented in Table 6.

Table 5

Mean Growth Scores and Adjusted Mean Growth Scores for Credit in Science

	Pretest	Posttest	N	Adjusted Posttest
Females	436.3636	419.2727	11	403.3124
Males	415.4848	408.3636	33	413.6837
Credit	434.9412	429.3529	17	414.8424
Noncredit	411.7407	399.5926	27	408.7288
Female--Credit	413.0000	405.7500	4	413.6028
Female--Noncredit	449.7143	427.0000	7	397.4322
Male--Credit	441.6923	436.6154	13	415.2239
Male--Noncredit	398.4500	390.0000	20	412.6827

Table 6

Adjusted ANOVA Summary Table for Credit in Science

Source	df	SS	MS	F	P
Sex	1	544.164	544.164	0.564	NS
Credit	1	673.253	673.253	0.697	NS
Sex X Credit	1	330.889	330.889	0.343	NS
Error	39	37,647.200	965.310		

Social Studies. As shown in Table 7, the adjusted mean score for those pupils taking social studies for credit was 477.971 and for those pupils not taking social studies the mean growth score was 458.412. The difference between those two mean growth scores was statistically significant if one is willing to risk the nine chances in 100 that the conclusion is false. The F-ratio for these two groups was 3.002 which has a probability level of $P < .09$. Given this probability level, one may conclude that some effect other than sampling is contributing to the higher scores for students taking social studies for academic credit. The adjusted ANOVA summary table is presented in Table 8.

Mathematics. The adjusted mean growth score for those pupils taking mathematics for credit was 551.563 and the adjusted mean growth score for those pupils not taking mathematics for credit was 569.535. The remaining adjusted mean growth scores as well as the mean growth scores for the pretest and posttest are presented in Table 9. Assuming an unusually liberal alpha level of .20, a statistically significant finding emerged in the analysis of those pupils taking mathematics for credit and those pupils not taking

mathematics for credit. The F-ratio for the between treatment group was 1.661 ($P < .20$) as shown in the results presented in Table 10.

Table 7

Mean Growth Scores and Adjusted Mean Growth Scores for Credit in Social Studies

	Pretest	Posttest	N	Adjusted Posttest
Females	479.500	471.500	18	469.140
Males	474.900	473.167	30	474.268
Credit	475.281	477.156	32	477.971
Noncredit	479.250	460.583	12	458.412
Female--Credit	481.818	482.818	11	478.715
Female--Noncredit	471.000	430.000	3	434.035
Male--Credit	471.857	474.191	21	477.581
Male--Noncredit	482.000	470.778	9	466.537

Table 8

Adjusted ANOVA Summary Table for Credit in Social Studies

Source	df	SS	MS	F	P
Sex	1	1,687.853	1,687.853	0.951	NS
Credit	1	5,326.192	5,326.192	3.002	0.09
Credit X Sex	1	1,936.567	1,936.567	1.092	NS
Error	39	69,189.139	1,774.080		

Table 9

Mean Growth Scores and Adjusted Mean Growth Scores for Credit in Mathematics

	Pretest	Posttest	N	Adjusted Posttest
Females	552.867	548.467	15	558.376
Males	571.517	570.517	29	565.392
Credit	563.375	550.125	16	551.563
Noncredit	566.179	570.357	28	569.535
Female--Credit	631.000	561.333	3	508.255
Female--Noncredit	533.333	545.250	12	570.907
Male--Credit	547.769	547.539	13	561.558
Male--Noncredit	590.813	589.188	16	568.507

Table 10

Adjusted ANOVA Summary Table for Credit in Mathematics

Source	df	SS	MS	F	P
Sex	1	4,647.107	4,647.107	0.897	NS
Credit	1	8,608.394	8,608.394	1.661	0.20
Credit X Sex	1	5,169.252	5,169.252	0.997	NS
Error	39	202,137.202			

Summary and Discussion

One significant finding was the discrepancy between the apparent level of mathematics competence and the levels in reading, language arts, social studies, science and use of sources. Assuming that the growth scores and norms are valid, the population of interest to the AEL/EBCE program is indeed unique. During the year, the subjects' growth rate exceeded the expected growth rate, even in mathematics, in all areas except use of sources. There were no significant differences on the ITED scores between the group which participated for the entire academic year and the group which participated for only half of the year. Reasonably, the conclusion that the two groups were from the same population was drawn. The fact that the pupils were taking courses for credit or noncredit had little apparent effect on performance in science, social studies and mathematics.

The objective of this report was to determine if the participants in the AEL/EBCE program maintained the same rate of academic growth that was expected of a similar group in the public high schools. Given this objective, some assumptions underlying the program need to be made explicit. If the assumption was that the AEL/EBCE program was to have an effect on the pupils in the areas of reading, language arts, mathematics, social studies, science and use of sources, then the data indicate that the effect did not occur. On the other hand, if the assumption was that the AEL/EBCE program was to have no detrimental effect, then the data clearly indicate that this was the case. This conclusion is tenable because the subjects achieved or exceeded (not statistically) the expected growth.

Some rather pertinent questions have emerged as a result of this investigation. First, why does the population seem to be "over skilled" in mathematics and "underskilled" in reading, language arts, social studies,

science, and use of resources? Perhaps one clue to this question is in the reading and language arts areas. Ostensibly, a conclusion could be that the deficiencies are attributable to lack of intellect, training, or both. This seems to be too simplistic and is also inconsistent with the high performance in mathematics. More reasonably, a conclusion could be that the measures in reading, language arts, and social studies are indicative of a difference instead of a deficiency. Some support for this conclusion is provided by public school personnel who contend that general population of West Virginia high school students tend to score much higher on normal mathematics instruments than on instruments for other conventional subject areas. So another question could be, "Just what is the nature of the difference in reading, language arts, and social studies for the general population of urban Appalachian youth and the normal non-Appalachian youth?" Perhaps an answer to this question might well open up provocative new avenues of program development.

Appendix A

Analysis of Variance Tables for Group I ITED Growth Score Comparisons over Three Testing Periods

Table A1

Analysis of Variance of Group I ITED Composite Growth Scores across Three Testing Periods

Source	df	SS	MS	F	P
Periods	2	2,158.32	1,079.16	0.17	NS
Residual	60	382,813.90	6,380.23		
Corrected total	62	384,972.22	6,209.23		

Table A2

Analysis of Variance of Group I ITED Reading Growth Scores across Three Testing Periods

Source	df	SS	MS	F	P
Periods	2	3,273.24	1,636.62	0.29	NS
Residual	60	336,706.76	5,611.78		
Corrected total	62	339,980.00			

Table A3

Analysis of Variance of Group I ITED Language Arts
Growth Scores across Three Testing Periods

Source	df	SS	MS	F	P
Periods	2	3,472.89	1,736.44	0.41	NS
Residual	60	254,124.00	4,235.40		
Corrected total	62	257,596.89			

Table A4

Analysis of Variance of Group I ITED Mathematics
Growth Scores across Three Testing Periods

Source	df	SS	MS	F	P
Periods	2	2,470.89	1,235.44	0.15	NS
Residual	60	499,685.43	8,328.09		
Corrected total	62	502,156.32			

Table A5

Analysis of Variance of Group I ITED Social Studies Growth Scores across Three Testing Periods

Source	df	SS	MS	F	P
Periods	2	5,071.84	2,535.92	0.37	NS
Residual	60	415,045.91	6,917.43		
Corrected total	62	420,117.75			

Table A6

Analysis of Variance of Group I ITED Science Growth Scores across Three Testing Periods

Source	df	SS	MS	F	P
Periods	2	5,638.69	2,819.35	0.48	NS
Residual	60	354,841.91	5,814.20		
Corrected total	62	360,480.60			

Table A7

Analysis of Variance of Group I ITED Use of Sources Growth Scores across Three Testing Periods

Source	df	SS	MS	F	P
Periods	2	1,063.14	531.57	0.09	NS
Residual	60	335,305.71			
Corrected total	62	336,368.85			

Appendix B

Analysis of Variance Tables for Group I and Group II ITED
Posttest Raw Score Comparisons for Winter
and Spring Testing Periods

Table B1

Analysis of Variance of ITED Winter Composite Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	63.64	63.64	0.22	NS
Subjects	42	12,217.15	290.88		
Corrected total	43	12,280.79			

Table B2

Analysis of Variance of ITED Winter Reading Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	36.11	36.11	0.08	NS
Subjects	42	19,585.53	466.32		
Corrected total	43	19,621.64			

Table B3

Analysis of Variance of ITED Winter Language Arts
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	186.34	186.34	.063	NS
Subjects	42	12,507.39	297.795		
Corrected total	43	12,693.93	295.21		

Table B4

Analysis of Variance of ITED Winter Mathematics
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	2.73	2.73	0.04	NS
Subjects	42	2,578.24	61.39		
Corrected total	43	2,580.97			

Table B5

Analysis of Variance of ITED Winter Social Studies
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	0.66	0.66	0.007	NS
Subjects	42	3,888.89	92.59		
Corrected total	43	3,889.55			

Table B6

Analysis of Variance of ITED Winter Science
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	0.08	0.08	0.01	NS
Subjects	42	4,393.64	104.61		
Corrected total	43	4,393.71			

Table B7

Analysis of Variance of ITED Winter Use of Sources
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	126.09	126.09	1.48	NS
Subjects	42	3,575.06	85.12		
Corrected total	43	3,701.15			

Table B8

Analysis of Variance of ITED Spring Composite
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	42.11	42.11	0.14	NS
Subjects	42	12,202.89	290.55		
Corrected total	43	12,245.00			

Table B9

Analysis of Variance of ITED Spring Reading
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	161.57	161.57	0.39	NS
Subjects	42	17,434.86	415.12		
Corrected total	43	17,596.43			

Table B10

Analysis of Variance of ITED Spring Language Arts
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	102.93	102.93	0.32	NS
Subjects	42	13,719.50	326.65		
Corrected total	43	13,822.43			

Table B11

Analysis of Variance of ITED Spring Mathematics
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	0.10	0.10	0.002	NS
Subjects	42	2,426.69	57.78		
Corrected total	43	2,426.79			

Table B12

Analysis of Variance of ITED Spring Social Studies
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	5.54	5.54	0.07	NS
Subjects	42	3,473.62	82.71		
Corrected total	43	3,479.16			

Table B13

Analysis of Variance of ITED Spring Science
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	6.41	6.41	0.06	NS
Subjects	42	4,552.02	108.43		
Corrected total	43	4,560.43			

Table B14

Analysis of Variance of ITED Spring Use of Sources
Raw Scores by Group I and Group II

Source	df	SS	MS	F	P
Group	1	143.61	143.61	1.47	NS
Subjects	42	4,093.55	97.47		
Corrected total	43	4,237.16			

Appendix C

Analysis of Covariance Tables for Selected ITED Subtest Scores according to Sex and Credit vs. Noncredit Differences Respective Subtest Scores as Covariates

Table C1

Analysis of Covariance of ITED Science Posttest Scores
by Sex and Credit vs. Noncredit Groups

Source	df	SS	F	P
Sex	1	544.16	0.56	NS
Credit	1	673.25	0.69	NS
Sex X Credit	1	330.89	0.34	NS
Pretest	1	159,590.63	165.33	0.001
Error	39	37,647.20		
Corrected total	43	216,489.64		

Table C2

Analysis of Covariance of ITED Social Studies Posttest Scores
by Sex and Credit vs. Noncredit Groups

Source	df	SS	F	P
Sex	1	1,687.85	0.95	NS
Credit	1	5,326.19	3.00	0.09
Sex X Credit	1	1,936.57	1.09	NS
Pretest	1	202,365.29	114.07	0.001
Error	39	69,189.14		
Corrected total	43	278,230.18		

Table C3

Analysis of Covariance of ITED Mathematics Posttest Scores
by Sex and Credit vs. Noncredit Groups

Source	df	SS	F	P
Sex	1	4,647.11	0.89	NS
Credit	1	8,608.39	1.66	0.20
Sex X Credit	1	5,169.25	0.99	NS
Pretest	1	291,401.38	56.22	0.001
Error	39	202,137.20		
Corrected total	43	511,408.00		

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